(15 points)

Using a pendulum, determine the value of *g* at your specific location.

1. From the list of available equipment check those additional materials you would use to determine the value of *g*. *(Note: a location to hang the pendulum is provided.)*
   1. Stop watch
   2. Small hanging mass
   3. Large hanging mass
   4. Meter stick
   5. Protractor
   6. Short string
   7. Long string
   8. Triple beam balance
   9. Masking tape
2. Sketch a diagram of your experimental set up and label the pieces of equipment that would be used.
3. Outline the experimental procedure you would use, including a list of quantities you would measure. For each quantity identify the equipment you would use to make the measurement.
4. Explain how you would calculate the value of *g* by using the measured quantities identified in (c).
5. How would a change of mass affect the results? Justify your answer.
6. Supposes the pendulum were moved to somewhere with half of Earth’s gravity. How would that effect the period? Justify your answer.

Rubric:

1. 2 points

For selection of length-measuring device (meter stick) 1 point

For selection of time-measuring device (stopwatch) 1 point

1. 2 points

For a sketch of the equipment selected in part (a) (meter stick

and stopwatch not required). 1 point

For labeling all the selected equipment 1 point

1. 4 points

Built pendulum as shown in diagram 1 point

Measured the length of the string 1 point

Pull pendulum back and release to begin periodic motion 1 point

Used stopwatch to determine period 1 point

1. 3 points

For including correct expression for the pendulum 1 point

For solving for a correct expression for *g* 1 point

For using the measurements described in part (c) 1 point

1. 2 points

For indicating that mass does not affect the results 1 point

For giving an explanation of why it does not affect the results 1 point

1. 2 points

For symbolically solving the new value of *T* 1 point

For indicating that *T* and *g* are directly proportional 1 point